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Original Research Article

Effect of gum chewing on bowel motility in women undergoing caesarean section: a hospital based experimental study

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ABSTRACT

Background: A cesarean delivery involves the delivery of a fetus through an open abdominal incision (laparotomy) and a uterine incision (hysterotomy). Paralytic ileus, also known as a non-mechanical obstruction, or postoperative ileus, is a malfunction of intestinal motility following major intra- or extra-abdominal surgery due to extensive bowel handling or an infection. Chewing of gum, mimics the ingestion of food and is considered a form of sham feeding. In this study, we have employed the use of chewing gum, to improve and hasten the onset of bowel motility in postoperative LSCS patients.
Methods: This is a hospital based experimental study conducted at Chettinad Hospital and Research Institute, Kelambakkam, for a period of 3 months. The study was done among pregnant women who delivered via lower segment caesarean section at the institute. It included 150 women with 75 of them in the chewing gum group and other 75 in control group. Convenient sampling technique was adopted.
Results: The chewing gum group showed earlier appearance of bowel sounds and passage of flatus and shortened duration of hospital stay as compared to the control group. The difference between the same was found to be statistically significant.
Conclusions: The use of chewing gum after cesarean delivery can significantly enhance intestinal motility. This reduces the incidence of postoperative ileus following caesarean delivery.

Keywords: Bowel motility, Chewing gum, Cesarean delivery, Sham feeding

INTRODUCTION

A cesarean section is one of the methods of childbirth and it involves the delivery of a fetus via a uterine incision (hysterotomy) and an open abdominal incision (laparotomy).[1] The prevalence of cesarean sections worldwide has increased from about 7% in 1990 to 21% currently, and it is expected to rise further over the next ten years. The World Health Organization (WHO) has released recent data showing that the number of cesarean sections performed worldwide is increasing and currently accounts for more than one in five (21%) deliveries. According to the report, this percentage is expected to rise over the next ten years, with nearly a third (29%) of all births expected to occur by cesarean section by 2030.[2] A cesarean section can be a vital and life-saving procedure, but if one is done when there is no medical necessity for it, it can unnecessarily put women and newborns at risk for both short- and long-term health issues. Caesarean delivery is associated with many postoperative complications, of which Paralytic ileus and obstruction are significant gastrointestinal complications. Ileus, also known as a non-mechanical obstruction, paralytic ileus, or postoperative ileus, is a malfunction of intestinal motility following major abdominal surgery. It is brought on by a non-mechanical insult that interferes with the

gastrointestinal tract's normal organized propulsive motor action. Postoperative paralytic ileus is most common following intestinal surgery (20%); it also happens after cholecystectomy (8.5%), appendectomy (6%), hysterectomy (4%), and gynaecological surgery (10-15%). Paralytic ileus is the term used to characterise postoperative ileus that persists for more than five days. Along with lengthier hospital stays, discomfort, abdominal distension, difficulty initiating eating and nursing, and a delay in healing.[4]

Gum chewing mimics food ingestion, and is considered a form of sham feeding. It is hypothesised to have a physiologic mechanism for improving bowel motility by stimulating the cephalic-vagal route, which enhances intestinal myoelectric activity to counteract the stimulation of the gastrointestinal opioid receptors. This reaction stimulates bowel movement both humorally and neurologically. Chewing gum has been shown in recent years to accelerate the recovery of gut function after gynaecological, abdominal, and obstetric procedures, leading to an increase in bowel motility.[4] Chewing gum, is a type of sham feeding, as a quick, low-cost way to speed up the recovery of gastrointestinal motility following cesarean surgery.[5] The purpose of the study was to find out the impact of chewing gum on the intestinal motility in women having cesarean sections and also the difference in its effects between emergency and elective procedures.

METHODS

This is a hospital based experimental study done at Chettinad Hospital and Research Institute, Kelambakkam, Chennai, India for 3 months from February through April 2024. The study was conducted among pregnant mothers who had delivered via Lower Segment Caesarean Section during the study period at Chettinad Hospital and Research Institute. Ethical approval for the study was obtained from the Institutional Ethics Committee. All the participants enrolled in the study were duly informed about the study procedure and consent was obtained for the same. The study included 150 women, of which 75 of them were in the chewing gum group and the other 75 were in the control group. Convenient sampling technique was adopted. The study included all the pregnant women who had undergone Lower segment Caesarean section as a mode of delivery irrespective of the indications, whether electively or as an emergency. Women who had history of previous gastrointestinal surgery in the past or extensive abdominal surgery were excluded from the study.

The participants were divided into two equal groups, one group was offered chewing gum and the other was not. In this study, a 3.3g chewing gum containing artificial sweeteners was used. Patients in Group I (study group) were advised to begin chewing the gum two hours of the surgery, and they were instructed to chew it for 15 minutes and spit it out. They were asked to repeat this process every two hours until the first flatus passes, the bowel sounds could be heard, or till 12 hours post procedure, whichever occurs first. Patients in Group II (control group) were managed as per standard departmental postoperative feeding protocol.

The collected data was entered into Microsoft Excel 2019 and the master chart was created. The master chart was then loaded onto SPSS version 26 for statistical analysis. The quantitative variables were expressed in terms of mean and standard deviation and the qualitative variables using frequency and percentage. To compare the mean between the groups independent samples t test was used. To compare the distribution of qualitative variables between the groups, chi square test was used.

RESULTS

Table 1 shows the demographic characteristics of participants in the chewing gum and control groups. The average age of participants in the Group 1 was 26.04±4.26 years. In Group 2, the average age was slightly lower at 24.16±4.13 years with p value 0.383. The mean BMI for the chewing gum group was 23.39±3.14 and the control group was 23.67±2.75 with p value of 0.546. The demographic data indicate that the participants in the chewing gum and control groups were similar in terms of age and BMI, with minor variations in their mean values.

Table 1: Demographic characteristics of study participants.

Variable	Mean±SD		P value
	Chewing gum Group 1	Control Group 2	
Age (years)	26.04±4.26	24.16±4.13	0.383
BMI	23.39±3.14	23.67±2.75	0.546

Table 2 presents the indications for Lower Segment Cesarean Section (LSCS) categorized into elective and emergency procedures. In total, there were 44 elective and 116 emergency LSCS procedures. The most common indication for elective LSCS was a history of previous LSCS (36.4%), while fetal distress (28.4%) was the leading cause for emergency LSCS followed by non-progression of the labour (22.4%).

In Table 3, the comparison of postoperative recovery outcomes between the chewing gum and control groups reveals statistically significant differences in bowel movements, passage of flatus, and length of hospital stay. Participants in the chewing gum group had faster bowel movements (mean = 3.79 hours, SD = 1.07) compared to the control group (mean = 8.55 hours, SD = 1.76), with a statistically significant difference (F = -20.717, p<.001). The passage of flatus also occurred earlier in the chewing gum group (mean = 14.31 hours, SD = 1.78) than in the control group (mean =16.78 hours, SD =1.88), with a significant difference (F = 0.681, p<.001). However, there was no significant difference in the passage of stools between the groups (F = 1.217, p =0.255). Importantly, the length of hospital stay was shorter for the chewing gum

group (mean = 4.63 days, SD = 0.70) compared to the control group (mean = 4.96 days, SD =0.60), with a significant difference (F = -3.262, p =0.01). These findings suggest that chewing gum may enhance postoperative recovery and reduce the duration of hospital stays.

Table 2: Indications for elective and emergency LSCS.

LSCS	Indications	N	Percent
Elective	Multiple pregnancy	3	6.8
	Breech	2	4.6
	Other malpresentation	1	2.3
	IUGR	6	13.6
	Previous LSCS	16	36.4
	CPD	6	13.6
	Placenta previa	3	6.8
	Macrosomia	4	9.1
	Precious pregnancy	3	6.8
	Total	44	100.0
Emergency	Antepartum hemorrhafe	3	2.6
	IUGR	4	3.4
	Chorioamnionitis	1	0.9
	CPD	5	4.3
	Failed induction	17	14.7
	Fetal distress	33	28.4
	Malpresentations	3	2.6
	Multifetal pregnancy	1	0.9
	Severe preeclampsia/ eclampsia/HELLP	11	9.5
	Post-dated pregnancy	3	2.6
	Non-progression	26	22.4
	PROM	6	5.2
	Oligohydramnios	3	2.6
	Total	116	100

Table 3: Comparison of outcomes of bowel motility between the two groups.

	Chewing gum Group 1		Control Group 2		F statistic	p value
	Mean	SD	Mean	SD		
Bowel movements	3.79	1.07	8.55	1.76	-20.717	.000
Passage of flattus	14.31	1.78	16.78	1.88	0.681	.000
Passage of stools	40.66	3.76	41.10	3.84	1.217	0.255
Length of stay	4.63	0.70	4.96	0.60	-3.262	0.01

Table 4: Comparison of outcomes of bowel motility between elective LSCS and emergency LSCS.

LSCS	Variables	Chewing gum Group 1		Control Group 2		p value
		Mean	SD	Mean	SD	
Emergency	Bowel movements	2.95	0.43	2.95	0.43	0.00
	passage of flatus	12.32	0.56	15.79	0.71	0.00
	passage of stools	40.52	3.84	40.53	4.09	0.26
	Length of stay	4.04	0.20	5.00	0.00	0.00
Elective	Bowel movements	4.17	1.06	8.64	1.99	0.00
	Passage of flatus	15.22	1.34	17.08	2.03	0.00
	Passage of stools	40.73	3.76	41.28	3.77	0.43
	Length of stay	4.89	0.69	4.95	0.69	0.64

The comparison of postoperative outcomes between the chewing gum and control groups for both emergency and elective LSCS in Table 4 shows the significant differences in key recovery metrics. In emergency LSCS cases, the

chewing gum group experienced earlier passage of flatus (mean = 12.32, SD =0.56) compared to the control group (mean = 15.79, SD =0.71, p<0.001), and a shorter length of hospital stay (mean = 4.04 days, SD = 0.20) compared to the control group (mean = 5.00 days, SD = 0.00, p<0.001). For elective LSCS cases, the chewing gum group had earlier bowel movements (mean = 4.17 hours, SD = 1.06) compared to the control group (mean = 8.64, SD = 1.99, p<0.001), and earlier passage of flatus (mean = 15.22 hours, SD = 1.34) as compared to the control group (mean = 17.08 hours, SD = 2.03, p<0.001), while the length of stay was not significantly different between the groups (p = 0.64). These findings suggest that chewing gum may improve certain aspects of postoperative recovery, particularly in reducing the time to passage of flatus and shortening the hospital stay in emergency LSCS cases.

DISCUSSION

The present study was a hospital based analytical study with the objective to find out how chewing gum affected the motility of the intestine in women having postoperative cesarean sections. The study was carried out in Chettinad Hospital and Research Institute, Kelambakkam, Tamil Nadu for a period of 3 months. Two groups of 75 in each group were recruited. The demographic data indicate that the participants in the chewing gum and control groups were similar in terms of age and BMI. The average age of participants in the chewing gum group was 26.04±4.26 years whereas in the control group, the average age was slightly lower at 24.16±4.13 years with a p value of 0.38 which was not significant. The mean BMI for the chewing gum group was 23.39±3.14 and the control group was 23.67±2.75, with a p value of 0.546 which was not statistically significant. The finding was similar to Aboubaker et al and Manisha et al who have also conducted their studies with two groups that were similar in terms of demographic characteristics.[4,5] Participants in the chewing gum group had earlier bowel movements (mean = 3.79 hours, SD = 1.07) compared to the control group (mean = 8.55 hours, SD = 1.76), with a statistically significant difference (F = -20.717, p<0.001). The passage of flatus was also earlier in the chewing gum group (mean = 14.31 hours, SD = 1.78) than in the control group (mean = 16.78 hours, SD = 1.88), with a significant difference (F = 0.681, p<0.001). However, there was no significant difference in the passage of stools between the groups. This was consistent with the finding of Manisha et al who observed that usage of chewing gum results in significantly lesser time required for bowel sound appearance, passage of flatus and stools.[(5)] Ledari et al also shows that the onset of first bowel sounds and the passage of flatus is earlier in the chewing gum group than in control group.[6] Deshande et al also observed a similar result which shows the return of bowel movement and first passage of flatus was earlier in study group than in control group.[7] Akalpler et al also observed a similar result with the usage of chewing gum.[8]

The study also compared the outcomes between elective LSCS and emergency LSCS. In elective LSCS, the chewing gum group had earlier bowel movements and earlier passage of flatus while the length of stay was not significantly different between the groups. Darwish et al in their study observed that chewing gum has resulted in early passage of flatus and decreased hospital stay.[9] Madhumala et al in their study observed a similar finding that chewing gum has quickened the passage of first flatus after surgery and reduced the incidence of post-operative nausea and vomiting also Gayathri et al in the study with the majority of the participants from emergency LSCS also showed that the time of passage of flatus , first passage of faeces and length of hospital stay were quickened with the usage of chewing gum.[10] There are limited studies that compared the difference in outcome between emergency and elective LSCS on usage of chewing gum similar to our study. The study had few limitations that includes the lack of data on the tolerability of the gums which is not assessed during the study. Interaction of chewing gum with other postoperative complications like vomiting was not included in the study.

CONCLUSION

It can thus be concluded from the present study that chewing gum after cesarean delivery can enhance intestinal motility which is evident by significantly lesser time required for bowel sound appearance, passage of flatus and stools. This reduces the incidence of postoperative ileus following a caesarean section.

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